National Cooperative Soil Survey

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Issue 18

# NCSS Newsletter

## In This Issue—



### Editor's Note

Issues of this newsletter are available on the World Wide Web (www.statlab.iastate.edu/soils/soildiv). Click on NCSS and then on the desired issue number of the NCSS Newsletter.

You are invited to submit stories for future issues of this newsletter to Stanley Anderson, National Soil Survey Center, Lincoln, Nebraska. Phone—402-437-5357; FAX—402-437-5336; email—stan.anderson@nssc.nrcs.usda.gov.

## A Few Final Thoughts

By Horace Smith, Director (retired), Soil Survey Division, NRCS, Washington, D.C.

When I became Director of the Soil Survey Division in November 1996, I had seven major initiatives that I wanted to get accomplished during my tenure. I elaborated on these initiatives and other goals in a personal letter to National Cooperative Soil Survey (NCSS) cooperators and in the first NCSS Newsletter. I am proud of the accomplishments we achieved during my tenure. When I retired on January 3, 2002, all of these major initiatives had been completed with the exception of one.

A few things that we did together for which we all should be proud include:

1. Placed special emphasis on the field and improved the grade structure and overall status of the field soil scientist;
2. Accelerated the implementation of the Major Land Resource Area (MLRA) concept for project soil survey activities, including the establishment of expanded or "Super" project offices;
3. Reorganized the National Soil Survey Center (NSSC) and established a Director and five functional areas;
4. Established an NCSS Advisory Group to serve as a sounding board for the Division Director and leadership of the Soil Survey Program;
5. Conducted townhall meetings or listening sessions at strategic locations around the country to get feedback from users on the future of soil survey, with special emphasis on products and services;

**Horace Smith**

6. Maintained a strong international component within the Soil Survey Program that supported short- and long-term international assignments of NCSS soil scientists and hosted numerous visiting scientists and sabbaticals from around the world;
7. Emphasized the introduction of new technology into soil survey at the field level and established a position on the Director's staff to coordinate this effort;
8. Coordinated a very successful centennial celebration of the NCSS during 1999 and initiated an annual soil survey calendar/planner;
9. Issued key publications and soil survey standards, such as *Soil Taxonomy*, second edition, *Soil Biology Primer*, and *Field Book for Describing and Sampling Soils*; and
10. Established a Soil Science Scholars Program.

As I see it, some key challenges of the NCSS in the future will include but will not be limited to:

1. The ability to maintain a centralized Soil Survey Program with strong Federal coordination and leadership;
2. The ability to maintain a Soil Survey Program that has strong and active participation by experiment stations from all regions of the country;
3. The ability of the land grant institutions and NCSS to attract high-achieving students into the soil science discipline;
4. The ability to find a way to bring new resources into the NCSS independent of the standard Federal allocation process;
5. The ability of soil survey leaders at the field and national levels to continue to convince decision-makers within Federal agencies of the importance of the Soil Survey Program and how it supports and complements technical assistance and other conservation and environmental programs; and
6. The ability to properly deal with anthropogenic soils and those soils that have been severely altered by drainage and land-leveling practices without violating scientific principals and the tenets of *Soil Taxonomy*.

I want to thank the scientists, partners, and members of the NCSS at all levels for the important role they played in allowing me to have a successful tenure as Director. ■

## New NASIS Leader

Rick Bigler has been promoted to Soil Scientist with responsibilities for NASIS at the National Soil Survey Center, Lincoln, Nebraska. He received a B.S. degree in soils at the University of Wisconsin-River Falls in 1972 and a M.S. in soils at North Dakota State University in 1981.

Rick began working for the Soil Conservation Service (SCS) as a soil scientist student trainee in North Dakota in 1971. He was a Peace Corps volunteer in Malaysia for 2 years following the completion of his B.S. degree. After returning to the United States, he worked on three soil surveys for SCS in North Dakota. In 1987, he moved to Minnesota to work in the SCS State Office with responsibilities for soil interpretation records and as soil database manager. In 1989, he moved to the NSSC to work with soil databases.

Rick is a member of the American Society of Agronomy, the Soil Science Society of America, and the Soil and Water Conservation Society. ■

## New Director of the Soil Survey Division

On January 13, 2002, Berman D. Hudson became Director of the Soil Survey Division, Natural Resources Conservation Service.

Born in South Charleston, West Virginia, Berman graduated from South Charleston High School in 1964. He received a B.S. degree from West Virginia University in 1969, an M.S. degree in Forest Soils from West Virginia University in 1971, and a Ph.D. degree in Soil Science (Soil Genesis and Classification) from North Carolina State University in 1983.

Berman started his career as a soil scientist in SCS (now NRCS) in March 1975. From 1975 to 1985, he served in positions of increasing responsibility in the soil survey program of North Carolina, including soil survey party member, soil survey party leader, and Assistant State Soil Scientist. After working as a soil scientist in the World Soil Geography Unit in Washington, D.C., from June 1985 to June 1986, Berman became the State Soil Scientist in Maryland. He served in that position until September 1987, when he became a Supervisory Soil Scientist at the National Soil Survey Center, in Lincoln, Nebraska, a position he held until January 1994. From January 1994 to January 1996, he was detailed on IPA assignment to the USEPA Environmental Monitoring and Assessment Program, U.S. Forest Service Laboratory, Southern Station, Research Triangle Park, North Carolina.

After working in the private sector as a soil and environmental consultant from 1996 to 1998, Berman returned to NRCS, serving as soil scientist/ landscape analyst in the Soil Survey Division in Washington, D.C., from March 1998 to August 1999; as the National Leader for Soil Survey Interpretations, National Soil Survey Center, Lincoln, Nebraska, from August 1999 to August 2001; and as a Senior Soil Scientist from August 2001 to January 2002.

Berman's M.S. thesis is entitled "Soil Factors Affecting the Pathogenecity of *Cylindrocladium scoparium*," and his dissertation is entitled "Use of Soil Classification to Predict Forest Site Quality on the Southeastern Coastal Plain." Berman authored the *Soil Survey of Cumberland and Hoke Counties, North Carolina* (1984) and has published numerous articles in *Soil Science Society of America Journal*, *Journal of Soil and Water Conservation*, and *Soil Survey Horizons.* Four of these published articles are centered on the systematics of soil survey in the United States:

Hudson, B.D. 1980. Ranges of Characteristics—How Valid are They? *Soil Survey Horizons* 21 (3): 7-11.

Hudson, B.D. 1990. Concepts of Soil Mapping and Interpretation. *Soil Survey Horizons* 31 (3): 63-72.

Hudson, B.D. 1992. Soil Survey as Paradigm-Based Science. *Soil Science Society of America Journal* 56 (3): 836-841.

Hudson, B.D., and J.R. Culver. 1994. Map Scale in the Soil Survey. *Soil Survey Horizons* 35 (2): 36-40. ■

## New National Leader for Soil Survey Interpretations

Karl W. Hipple has been selected as National Leader for Soil Survey Interpretations at the National Soil Survey Center, Lincoln, Nebraska. Dr. Hipple has spent most of his soil survey career in the Pacific Northwest working for the Idaho Soil Conservation Commission and the SCS and NRCS in Idaho and Washington. Karl was born and raised in Pennsylvania and graduated from Old Dominion University, Norfolk, Virginia, with a B.S. in biology and physical science. After teaching secondary school for 3 years in Virginia, he was accepted in graduate school at the University of Idaho (UI), Moscow, Idaho. He completed both M.S. and Ph.D. degrees at UI. While studying at UI, Karl had the good fortune to actively map soils in the Latah County area, Idaho, soil survey. "Working in your chosen career field while completing the academic portion of an advanced degree, is like having your cake and eating it too," says Hipple.

Karl worked in northern Idaho as a soil scientist from 1975 to 1981 (in Clearwater, Nez Perce, Lewis, and Latah Counties) and as a soil survey project leader in east-central Idaho from 1981 to 1989 (in Custer, Lemhi, and Butte Counties). For the past 12 years, Karl has been state soil correlator, soil database manager, and state soil scientist in Washington State.

**Karl Hipple**

Karl is a member of the Idaho Soil Scientist Association, the Washington Society of Professional Soil Scientists (past president, president-elect, and newsletter editor), and the Soil and Water Conservation Society of America. ■

## Cathy Seybold Joins the Soil Survey Interpretations Staff

Cathy A. Seybold has been reassigned to the Soil Survey Interpretations Staff at the National Soil Survey Center, Lincoln, Nebraska. Dr. Seybold has spent the last 6 years working for the NRCS Soil Quality Institute in Corvallis, Oregon. Before the years at the Soil Quality Institute, Cathy spent 2.5 years working for NRCS in Virginia as part of the Center for Excellence for Water Quality, under a cooperative agreement between NRCS and Virginia State University. At Virginia State University, Cathy taught soils classes and conducted research in the fate and transport of pesticides in soils and vegetative filter strips.

Cathy was born and raised in Wisconsin and attended the University of Nebraska-Lincoln on a track scholarship. At Nebraska, she received a B.S. degree in soil science and a M.S. degree in agronomy. During her senior year at Nebraska, she was a student worker at the Soil Survey Laboratory in Lincoln, working for Otto Baumer. After completing her M.S. degree, she worked for NRCS as a soil scientist mapping soils in southeast Kern County, California. After mapping for a couple of years, Cathy went on leave (leave-without-pay) to get a Ph.D. in soil science (with a minor in geology) from the University of Wisconsin-Madison. Cathy returned to NRCS and was placed in the NRCS State Office in California, where she worked on water-quality issues. Shortly thereafter, she went on to work for NRCS in Virginia.

Cathy is a member of the Soil Science Society of America and the Soil and Water Conservation Society of America and is a certified ARCPACS professional soil scientist. ■

**Cathy Seybold**

## Soil Biology Program Evaluates Organic Matter Pools

By Carol Franks, Research Soil Scientist, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

The Soil Biology Program was implemented by the National Soil Survey Center (NSSC) to develop an understanding of, and eventually develop soil interpretations about, biological characteristics of soils. Along with climate, soil organisms and micro-organisms control the turnover rate of organic matter and thus play an important role in energy and nutrient cycling in soil systems. A primary objective of the Soil Biology Program is to evaluate and measure soil biological characteristics related to the amount and turnover rate of organic matter of the three organic matter pools in soils—fast pool, intermediate pool, and slow pool. Pool data are useful in the study of carbon dynamics and macronutrient cycling, soil quality determinations, understanding of global climate change, evaluation of long-term soil fertility, and soil survey enhancement. The data can also help farmers, ranchers, other land owners, land use planners, and conservationists assess the effects of conservation management practices and erosion.

Initiated as a research program, the Soil Biology Program is now providing soil analyses and assistance on a limited, request basis for special projects around the country. Eligible projects are selected in a review process from those submitted at the state level through state soil scientists, major land resource area offices, and state conservationists. Available soil analyses include organic carbon with enhanced accuracy through gas chromatography; soil carbon to nitrogen ratios related to the composition of plant and microbial communities; microbial biomass and activity, two labile carbon fractions, and potential mineralizable nitrogen from microbial activity for the fast pool; root biomass and particulate organic matter (POM >53 µm) for the intermediate pool; and clay associated amorphous organic matter (C-Min <53 µm) for the slow pool.

Also available, for general use, are fact sheets describing field methods for determining soil fauna, root biomass, and total soil organic matter. Information and educational materials available include “Basic Biological Factors of Soil Carbon and Nitrogen,” poster or page-size handouts; fact sheets about the Soil Biology Program; “Implementation of Soil Biological Analyses at the NRCS-NSSC Soil Survey Laboratory,” a poster; and “Evaluation and Interpretation of Soil Biological Data from Two Selected Sites,” a poster. Some of the above, including the posters, are available on the NSSC Web site (http://www.nssc.nrcs.usda.gov).

For more information, contact Carol Franks, National Soil Survey Center (402-437-5316 or carol.franks@nssc.nrcs.usda.gov). ■

## Computer-Assisted Checks for Coordination of Prime Farmland Soils, Capability Classification, and Productivity Ratings

By Ray Sinclair, Soil Scientist, National Soil Survey Center, Natural Resources Conservation Service, Lincoln, Nebraska.

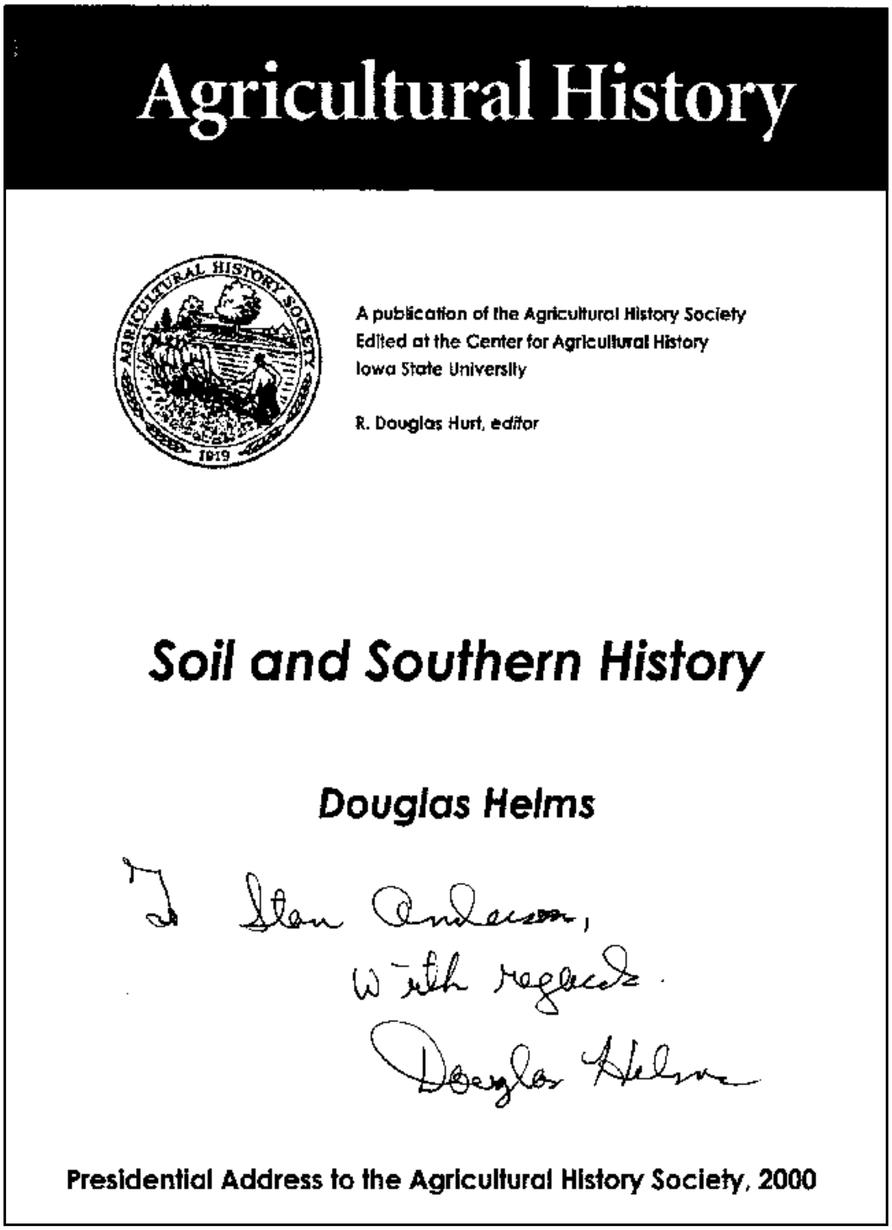
A new report script is available in NASIS that will help soil scientists determine which soils qualify as prime farmland. The script evaluates soils using the prime farmland criteria printed in Title 7 of the Code of Federal Regulations-Part 657 dated January 1, 2001. The report produces a table of soils data and prime farmland classification by major land resource area (MLRA), soil survey, or county/parish. These tables will help scientists identify errors or inconsistencies in the soil database. The reports will also help scientists coordinate prime farmland map units across county and state lines throughout each major land resource area. Since many of the same soil and environmental characteristics used in the prime farmland criteria are also used to place soils into the land capability classification system or assess soil productivity ratings, the script can also help scientists determine land capability classification and develop productivity ratings. The MLRA table is especially useful because it reduces the time required to search the database for soils in the MLRA. For more information, contact Ray Sinclair, National Soil Survey Center (402-437-5699 or ray.sinclair@nssc.nrcs.usda.gov). ■

## A History Lesson

By Craig Ditzler, National Leader for Soil Classification and Standards, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.[1]

Douglas Helms, NRCS Historian, Washington, D.C., has published a fascinating article linking soil science to the history of the Southern United States (Helms, Douglas. 2000. Soil and Southern History. Agricultural History 74: 723-758). He begins his article with the

[1] Future editions of the National Cooperative Soil Survey Newsletter will include reviews of books or journal articles by one of the Soil Survey Division Leaders.



# Agricultural History

A publication of the Agricultural History Society
Edited at the Center for Agricultural History
Iowa State University

R. Douglas Hurt, editor

## Soil and Southern History

**Douglas Helms**

To Stan Anderson,
With regards.
Douglas Helms

**Presidential Address to the Agricultural History Society, 2000**

suggestion that a knowledge of science can help the agricultural historian to better interpret historical developments. He goes on to relate to the reader how soil properties characteristic of some major soils of the Southern United States influenced the historical development of the region. The primary soil-related influence on early development pertains to the parent materials from which the soils formed and the resulting degree of natural fertility. After a short primer on soil fertility and plant nutrition, Helms states:

> The bases and phosphorous do not lie evenly distributed on the earth's surface. Mother nature has been rather fickle in the distribution of base-rich parent materials. Farmers immemorial either found base-rich soil upon which to settle, or brought these fertilizers to their lands, or employed management devices such as shifting cultivation in base-poor soils.

Helms explores several interesting examples illustrating how soil properties, especially those related to natural fertility, affected the development of the region.

One major group of soils in the region is the Ultisols, which Helms describes as follows:

> The red iron oxide-coated, kaolinite clays of the Piedmont, termed ultisols, derived mainly from metamorphic and igneous granites and granite gneisses and are low in the content of bases.

Helms suggests that historians have generally misunderstood the limited suitability of these infertile soils for agricultural systems lacking sources of supplemental fertilizers. In Helms' view historians have over-emphasized concepts of early Southern farmers "exhausting" or "depleting" the soil and then moving on to clear new lands after in effect abusing previously cleared areas. Helms explains that in fact early farmers of the South's Ultisols practiced a form of shifting agriculture common in many tropical regions. He points out that the amount of nutrients concentrated in a pine tree over a 20- to 30-year period is roughly equivalent to the nutrients required by cultivated crops over a 100-day growing season. So it makes sense that the early farmers developed a system of large land holdings where the trees of one area would be cleared and burned to release their store of nutrients. After a few seasons, the nutrients would be used up and that plot had to be allowed to go back into trees to begin the slow process of pulling nutrients from below and storing them in new trees for release again in 20 to 30 years. Helms notes that in 1860 rural areas of Alabama, Georgia, and Mississippi could support only 17.3 residents per square mile, while the more fertile lands (Mollisols) of Ohio, Indiana, and Illinois supported 37.5 residents per square mile. These differing capacities had a significant impact on the number of rural youths available to fight in the Civil War.

Helms contrasts the Ultisols of the Piedmont and Coastal Plain to the limestone-derived Alfisols of the famous Shenandoah Valley (part of the Ridge and Valley Province), which he describes as follows:

> Explorers found luxuriant tall prairie grasses teeming with wildlife, and the farmers established vibrant grassland agriculture in the limestone-derived soils. These soils, rich in the bases and phosphorous, unlike many of the Piedmont and coastal plain soils, could sustain low yields of production continuously or at least for a long time.

Historians generally credit the early farmers of this region, especially the German immigrants, with practicing exceptionally good soil stewardship and conservation. They established permanent pastures to raise cattle, recycled manure to their croplands, grew nitrogen-supplying legumes, and employed soil-conserving crop rotations. Helms correctly points out that it was the inherent nature of these soils, rich in calcium, magnesium, and phosphorus and endowed with favorable pH, that made it possible for these farmers to practice intensive diversified agriculture, unlike their contemporaries farming on the Ultisols.

One of the more interesting findings reported in this paper relates to the migration of early settlers from Maryland, Virginia, and Pennsylvania into the Deep South via the Great Philadelphia Wagon Road. Helms presents a map showing the route stretching from Philadelphia, across central Virginia and the Carolinas to Augusta, Georgia. He has superimposed the location of the road on the location of Alfisols in the region. Remarkably, the path of this important migration route (believed to have been traveled for centuries by native Americans following traditional hunting routes) closely follows scattered areas of Alfisols across the Piedmont.

The Alfisols, while not as high in fertility as the limestone-derived soils of the Ridge and Valley Province, are significantly more fertile than the Ultisols of the surrounding piedmont. The Alfisols formed in material weathered from metamorphic or igneous mafic rocks, such as gabbro, diorite, and diabase, or they occur in Triassic-age basins where the soils are influenced by ancient volcanic ash deposits from the now eroded away Uhwharrie Mountains and locally derived sediments.

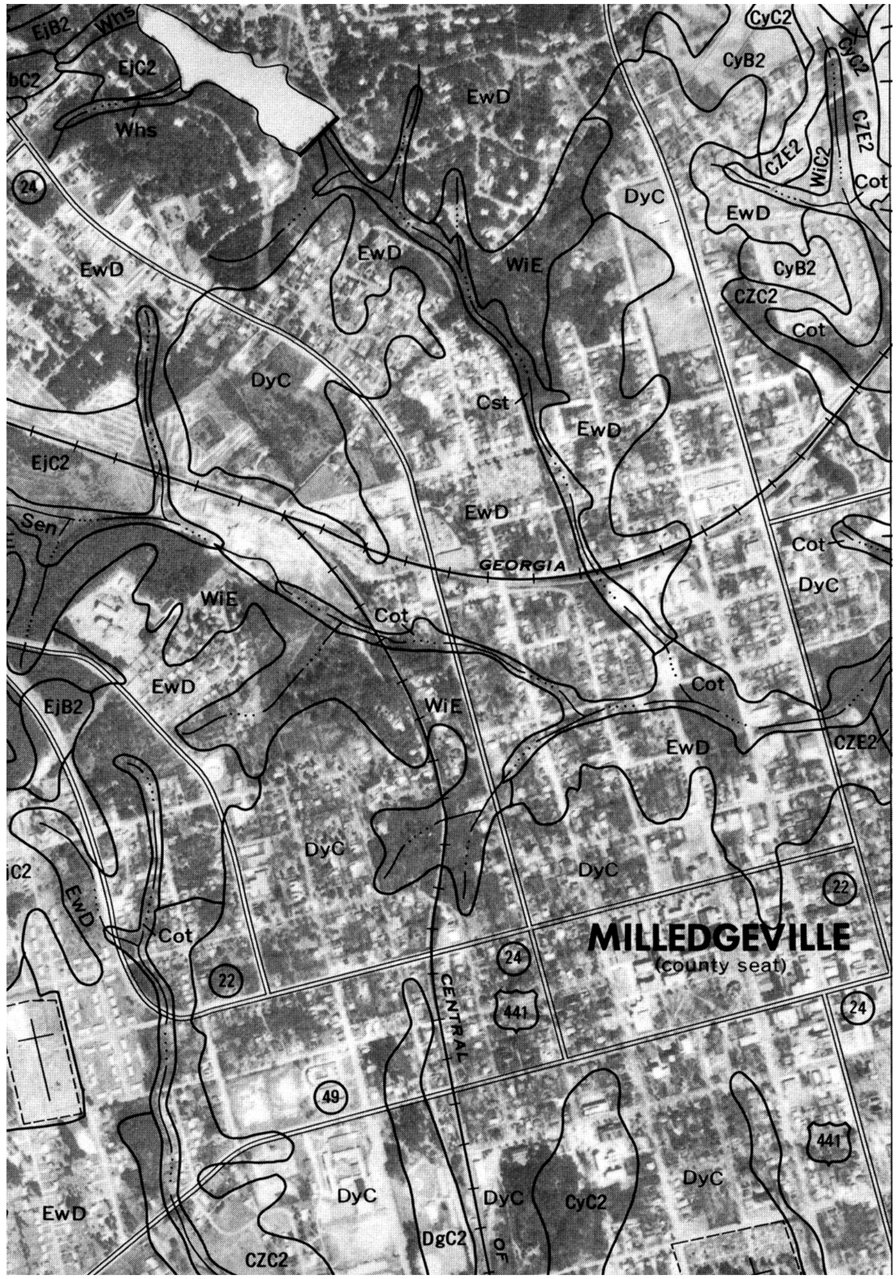
The Alfisols, although fairly clayey and sticky because of their content of smectitic clays, were superior to the surrounding Ultisols of the piedmont and were likely sought out by the early immigrants as desirable farmland because of their natural fertility. Helms points out that historians have generally overlooked this fact because, in light of today’s technology, these clayey Alfisols (such as White Store soils, which are fine, mixed, active, thermic Oxyaquic Vertic Hapludalfs) are not very desirable farmland. Today, abundant artificial fertilizers and ready supplies of lime make the Ultisols capable of producing continual high yields of row crops. At the time of settlement, however, the White Store soils and other Alfisols were considered superior. As a result, historians have generally assumed that immigrants, such as the Lutherans who settled on the Alfisol areas of Rowan County, North Carolina, were late arrivals having to settle for what is (today) considered less than desirable land. Helms argues that they purposely chose these areas. Given the technology of the period, these were among the best soils in the area because of their natural fertility. (There is a lesson here suggesting that our soil interpretations need to keep pace with technology changes over time.)

Helms goes on to relate similar analyses for the loess soils on the bluffs along the Mississippi River, the soils of the black belt in Alabama and Mississippi, and the delta soils of the Yazoo and Mississippi Rivers. He provides an insightful understanding of fluvial geomorphic processes resulting in such features as well drained, coarse-textured natural levees close to the channel and clayey, wet, back-swamp areas against the uplands. He concludes that soil science can contribute to our understanding of history:

> For the student of agricultural or environmental history, the knowledge provided by the relatively new field of soil science is a boon to understanding historical developments. In fact, a basic soil science, with some emphasis on agronomy, is highly recommended to students in these disciplines. ■

## Soil in a Story by Flannery O'Connor

By Stanley Anderson, Editor, USDA, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.




**Part of map sheet 53 in the *Soil Survey of Baldwin, Jones, and Putnam Counties, Georgia.* Map unit DyC is a Davidson-Urban land complex, WiE and WiC2 are Wilkes soils, and CyB2, CyC2, CZC2, and CZE2 are Cecil soils.**

You have to, uh, dig pretty deep to find references to soil in literature. I found one by searching for an answer to a query. Last September, the following message from a Cindy someone @yahoo.com was forwarded to me:

> Hello, I am researching for a play based on Flannery O'Connor's short stories, and was curious as to why the soil collected in Milledgeville was a red color?
>
> Please feel free to email or call with any type of answer.
>
> Thank you so much for your time!
>
> Cindy

I knew that O'Connor (1925-1964) was a Southern writer, so I figured that Milledgeville is in a Southern state. I searched for "Milledgeville" on the Internet. The town proved to be Milledgeville, Georgia, the capital of the state from 1807 to 1868. This town is in Baldwin County, which is in the Southern Piedmont and Carolina and Georgia Sand Hills Major Land Resource Areas (MLRAs). O'Connor lived in or near Milledgeville for many of the years of her short life. I did a little research and sent Cindy the following message:

> Cindy:
>
> I assume that the town is Milledgeville, GA. See the *Soil Survey of Baldwin, Jones, and Putnam Counties, Georgia*, which was published by USDA, Soil Conservation Service (now the Natural Resources Conservation Service), in 1976 and should be available at the NRCS State Office in Athens, GA.
>
> The dominant map unit in Milledgeville is DyC, which is the Davidson-Urban land complex, 2 to 10 percent slopes. See detailed map sheets 53 and 54. The soil is

most likely the Davidson series, which has a dark reddish brown surface layer and a dark red subsoil. (See pages 14-16 of the soil survey.) According to the description of map unit DyC (page 16), "In most places the original soil profiles have been severely modified by cutting, filling, and shaping." It is likely that this urban development has exposed the dark red subsoil in many places.

The reddish color probably results from the form of iron (probably hematite) in the soil. For insight, see the definitions of "hematite" in *Webster's New Collegiate Dictionary* (1977) and in *Glossary of Geology* (1987), edited by Robert L. Bates and Julia A. Jackson.

Stanley P. Anderson

I wondered which O'Connor story (or stories) Cindy was using as the basis for the play, so I asked her for the title (or titles). I was disappointed when I received the following response:

As far as I know, it's not an actual reference to the soil being red (the director found a sample of the soil on her trip), but two out of the three stories ("Greenleaf" and "A View of the Woods") have much to do with the land.

More later.

Cindy

I was further disappointed when I read "Greenleaf," which has no references to soil, but I hit, uh, pay dirt when I read "A View of the Woods" and discovered that soil has a bit part in the story.

"A View of the Woods" (1957) is about Mr. Fortune, a willful old man who, in the name of progress, sells off his land in pieces, mainly to spite his son-in-law, and Mary Fortune, his youngest grandchild, the only family member he can tolerate. The story opens with a description of a "machine that lifted out dirt and threw it in a pile" on a lakeside lot that was once part of Fortune's farm. There is a "red corrugated lake" at this site. The lake, like the red road running in front of the farm, gets its color from the soil.

The second paragraph of the story describes how Mary and her grandfather "watched, sometimes for hours, while the machine systematically ate a red hole in what had once been a cow pasture." The third paragraph describes Mary "looking down into the red pit, watching the big disembodied gullet gorge itself on the clay, then, with the sound of a deep sustained nausea and a slow mechanical revulsion, turn and spit it up."

The story ends tragically with the death of both Mary and her grandfather, who have a violent confrontation when he makes plans to sell off the front lawn and thus threatens to destroy their view of the woods. He strikes her head against a rock three times, killing her, and then he dies of a heart attack. The clearing in the pine woods where this tragedy occurs is described as "an ugly red bald spot" where a few stones protrude from the clay.

As the old man dies, he imagines that the red lake is engulfing him. Not knowing how to swim, he looks for help, "but the place was deserted except for one huge yellow monster which sat to the side, as stationary as he was, gorging itself on clay." The image of the machine moving the red clay is thus repeated in the last sentence of the story. It frames (or, more accurately, brackets) the story.

It is possible that the soil in "A View of the Woods" is a Cecil soil, especially if the setting is on or near the farm (called "Andalusia") where O'Connor lived with her mother from 1951 to 1964. In a letter dated May 4, 1955, O'Connor says that the farm is "4 miles from Milledgeville on the road to Eatonton," and in a letter dated June19, 1957, she says that it is "two houses from the road on Hwy. 441, four miles before you get to Milledgeville." The likelihood that the story is set on this farm is indicated in a letter dated January 13, 1957, in which O'Connor describes the place as "a dairy farm" where "most of the violences carried to their logical conclusions in the stories manage to be warded off." Andalusia is most likely in an area of Cecil sandy loam, 2 to 6 percent slopes, eroded (CyB2), in a delineation in the south-central part of map sheet 35 in the *Soil*


**Profile of a Cecil soil. Depth is marked in inches.**


**The south-central part of map sheet 35 in the *Soil Survey of Baldwin, Jones, and Putnam Counties, Georgia.* The farm "Andalusia" is probably in the delineation of map unit CyB2 along the road (Highway 441).**

*Survey of Baldwin, Jones, and Putnam Counties, Georgia.*

According to the official series description, Cecil soils have a surface layer and subsurface layer of very dark grayish brown and brown sandy loam about 7 inches thick and a subsoil that consists of yellowish red sandy clay loam about 4 inches thick, red clay about 29 inches thick, and red clay loam about 10 inches thick.

Other O"Conner works that refer to soil, mainly red Georgia clay, include "A Good Man Is Hard to Find" (1953), "The River" (1953), "The Displaced Person" (1954), "A Temple of the Holy Ghost" (1954), "You Can't Be Any Poorer Than Dead" (1955), and the novel *The Violent Bear It Away* (1960), which revises and expands "You Can't Be Any Poorer Than Dead."

In an essay about peacocks entitled "The King of the Birds" (1961), O'Connor notes that as a child she did not have "a scientific temperament." In a 1959 conversation with Betsy Lochridge of *The Atlanta Journal and Constitution Magazine*, she says, "Don't make me out a farm girl. All I know about the land is, it's underneath me." Her stories show little interest in soil as soil or as a productive growing medium for plants. An awareness of red Georgia clay is about as, uh, deep into soil science as she gets. Basic details about the color, texture, and depth of soil in the stories help to anchor her themes, which are mainly religious, in the real world or serve to strengthen her imagery.

## References

Fitzgerald, Sally, ed. 1988. *Flannery O'Connor: Collected Works.* The Library of America.

Magee, Rosemary M. 1987. *Conversations with Flannery O'Connor*. University Press of Mississippi.

United States Department of Agriculture, Soil Conservation Service. 1976. *Soil Survey of Baldwin, Jones, and Putnam Counties, Georgia*. ■

# Language Matters

By Stanley Anderson, Editor, USDA, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

The following is from the unedited proceedings of the 2001 NCSS Conference: "Partner with the primate sector." ■